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【特許請求の範囲】

【請求項1】硬化用光線の照射により硬化されるインクをプリント基材に対して噴射するインクノズルを有するプリントヘッド、

このプリントヘッドを上記プリント基材に対して移動させる駆動手段、

この駆動手段を制御する駆動制御部、

上記インクノズルから上記インクの噴射を制御するインクジェット制御部、

上記硬化用光線を発光する光源と、上記プリントヘッドに設けられている照射部とを有し、上記プリント基材に噴射されたインクに対して上記硬化用光線を照射する光

照射手段、

この光線照射手段による上記硬化用光線の照射を制御する照射制御部、及び入力された画像データ情報を基づいて上記駆動制御部、上記インクジェット制御部及び上記照射手段を制御するプリント制御部を備えていること

を特徴とするインクジェットプリンタ。

【請求項2】光線照射手段は、光源とプリントヘッドとの間に設けられ、上記駆動制御部の先端部に照射部を備えている光ケーブルと、上記照射部に設け

られているレンズとを有していることを特徴とする請求項1記載のインクジェットプリンタ。

【請求項3】プリント制御部は、硬化工用光線を照射する光線

タイミングをインクがプリント基材に付着するタイミングに合わせるように照射制御部及びインクジェット制御部を制御することを特徴とする請求項1又は請求項2に記載のインクジェットプリンタ。

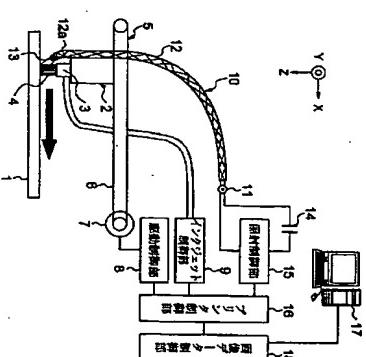
【請求項4】硬化工用光線として紫外線を照射する光線照射手段と、上記紫外線により硬化されるインクが使用されることを特徴とする請求項1ないし請求項3に記載のインクジェットプリンタ。

【請求項5】硬化工用光線としてレーザ光線を照射する光線照射手段と、レーザ光線により硬化されるインクとが使用されることを特徴とする請求項1ないし請求項3のいずれかに記載のインクジェットプリンタ。

【請求項6】インクの種類に応じて光源の種類が交換可能なになっていることを特徴とする請求項1ないし請求項3のいずれかに記載のインクジェットプリンタ。

【請求項7】プリント基材表面の凹凸を検出するセンサを備え、プリントヘッドは、上記駆動手段により上記プリント基材に対して接觸する方向へも移動可能になっており、駆動手段を制御することを特徴とする請求項1ないし請求項6のいずれかに記載のインクジェットプリンタ。

【発明の詳細な説明】



1:プリント基材
2:プリントヘッド
3:インクノズル
4:インクノズル
5:駆動手段
6:駆動手段
7:駆動手段
8:駆動手段
9:駆動手段
10:光線照射手段
11:光源
12:光ケーブル
13:レンズ

のである。

【0002】

【従来の技術】一般に、インクジェットプリンタでは、顔料等の着色剤を水又は溶媒剤等の液体に混合したインクが、インクノズルからプリント基材上に噴射される。また、樹脂フィルムや金属製のプリント基材の表面には、インクを速やかに乾燥硬化させてインクの捲きを防止するためのインク受容層が形成される。インク受容層は、例えば多孔質材料により構成されており、インクの溶剤を瞬時に吸収し、インクが広がらないようにするとともに、溶剤の気化を促進する。

【0003】【発明が解決しようとする課題】上記のような従来のインクジェットプリンタにおいては、プリント基材の表面にインク受容層を形成しておく必要があるため、プリント基材の加工に手間がかかるとともにコストが高くなってしまう。

【0004】この発明は、上記のような問題点を解決することを課題としてなされたものであり、プリント基材に特別な加工をすることなく、インクの捲みによる画質の低下を防止することができるインクジェットプリンタを得ることを目的とする。

【0005】【課題を解決するための手段】請求項1の発明に係るインクジェットプリンタは、硬化工用光線の照射により硬化されるインクをプリント基材に対して噴射するインクノズルを有するプリントヘッド、このプリントヘッドをプリント基材に対して移動させる駆動手段、この駆動手段を制御する駆動制御部、インクノズルからのインクの噴射を制御するインクジェット制御部、硬化工用光線を発光する光源と、プリントヘッドに設けられている照射部とを有し、プリント基材に噴射されたインクに対して硬化用光線を照射する光線照射手段、この光線照射手段による硬化用光線の照射を制御する照射制御部、及び入力された画像データ情報を基づいて駆動制御部、インクジェット制御部及び照射制御部を制御するプリント制御部を備えたものである。

【0006】請求項2の発明に係るインクジェットプリンタは、光線とプリントヘッドとの間に設けられ、プリントヘッドに照射部に照射部が設けられている光ケーブルと、照射部に設けられているレンズとを有する光線照射手段を用いたものである。

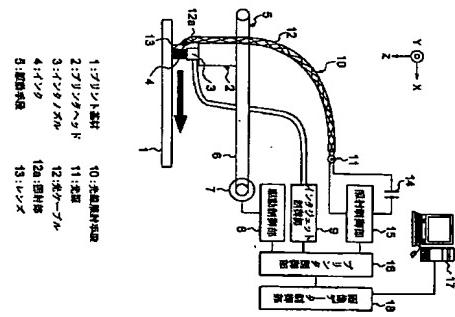
【0007】請求項3の発明に係るインクジェットプリンタは、光線とプリントヘッドとの間に設けられ、プリントヘッドに照射部に照射部が設けられている光ケーブルと、照射部に設けられているレンズとを有する光線照射手段を用いたものである。

【0008】請求項4の発明に係るインクジェットプリンタは、硬化工用光線の照射のタイミングをインクがプリント基材に付着するタイミングに合わせるように照射制御部及びインクジェット制御部を制御するプリント制御部を用いたものである。

【0009】請求項5の発明に係るインクジェットプリンタは、硬化工用光線として紫外線を照射する光線照射手段と、紫外線により硬化されるインクを使用したものが

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PATENT ABSTRACTS OF JAPAN

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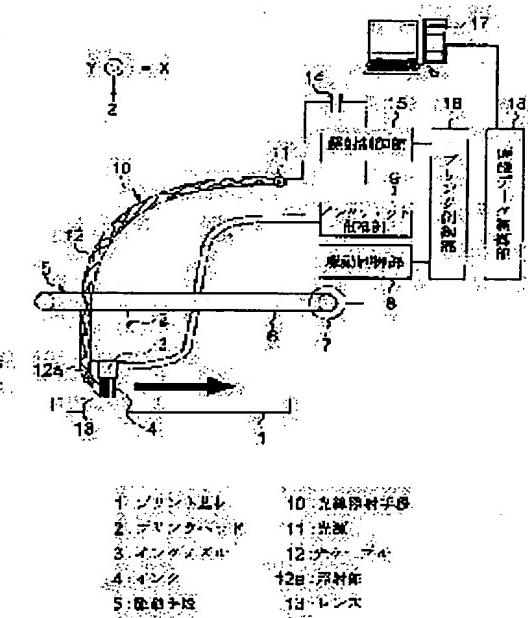
(71)Applicant : MITSUBISHI ELECTRIC CORP
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(54) INK JET PRINTER

(57)Abstract:

PROBLEM TO BE SOLVED: To prevent lowering of image quality due to bleed of ink without applying specific processing to a printed board.

SOLUTION: An ultraviolet-curable ink 4 is used and a light emitting section 12a for a light emitting means 10 is provided to a print head 2 having an ink nozzle 3. Ultraviolet rays are emitted to the ink 4 stuck to the printed board 1.



LEGAL STATUS

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CLAIMS

[Claim(s)]

[Claim 1] The printer head which has the ink nozzle which injects the ink hardened by the exposure of the beam of light for hardening to a print base material, The driving means to which this printer head is moved to the above-mentioned print base material, the drive control section which controls this driving means, the ink jet control section which controls injection of the above-mentioned ink from the above-mentioned ink nozzle, and the light source which emits light in the above-mentioned beam of light for hardening. A beam-of-light exposure means to irradiate the above-mentioned beam of light for hardening to the ink which has the exposure section prepared in the above-mentioned printer head, and was injected by the above-mentioned print base material, The ink jet printer characterized by having the exposure control section which controls the exposure of the above-mentioned beam of light for hardening by this beam-of-light exposure means, and the printer control section which controls the above-mentioned drive control section, the above-mentioned ink jet control section, and the above-mentioned exposure control section based on the inputted image data information.

[Claim 2] A beam-of-light exposure means is an ink jet printer according to claim 1 characterized by having the optical cable with which it is prepared between the light source and a printer head, and the exposure section is prepared in the point by the side of the above-mentioned printer head, and the lens prepared in the above-mentioned exposure section.

[Claim 3] A printer control section is an ink jet printer according to claim 1 or 2 characterized by controlling an exposure control section and an ink jet control section to double the timing of an exposure of the beam of light for hardening with the timing to which ink adheres to a print base material.

[Claim 4] The ink jet printer according to claim 1 to 3 characterized by using a beam-of-light exposure means to irradiate ultraviolet rays as a beam of light for hardening, and the ink hardened by the above-mentioned ultraviolet rays.

[Claim 5] The ink jet printer according to claim 1 to 3 characterized by using a beam-of-light exposure means to irradiate a laser beam as a beam of light for hardening, and the ink hardened by the laser beam.

[Claim 6] The ink jet printer according to claim 1 to 3 characterized by the class of light source being exchangeable according to the class of ink.

[Claim 7] It is the ink jet printer according to claim 1 to 6 which it has the sensor which detects the irregularity of a print base material front face, and the printer head is movable also in the direction which attaches and detaches to the above-mentioned print base material by the driving means, and is characterized by a drive control section controlling the above-mentioned driving means according to the information from the above-mentioned sensor.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the ink jet printer which prints by injecting ink from the ink nozzle of a printer head to a print base material.

[0002]

[Description of the Prior Art] Generally, in an ink jet printer, the ink which mixed coloring agents, such as a pigment, into liquids, such as water or a solvent, is injected on a print base material from an ink nozzle. Moreover, the ink absorbing layer for carrying out desiccation hardening of the ink promptly, and preventing a blot of ink is formed in the front face of the print base material made from a resin film metallurgy group. An ink absorbing layer promotes evaporation of a solvent while being constituted by the porous material, receiving the solvent of ink in an instant and making it ink not spread.

[0003]

[Problem(s) to be Solved by the Invention] In the above conventional ink jet printers, since it is necessary to form an ink absorbing layer in the front face of a print base material, while processing of a print base material takes time and effort, cost will become high.

[0004] This invention aims at obtaining the ink jet printer which can prevent deterioration of the image quality by blot of ink, without making solving the above troubles as a technical problem, and carrying out processing special to a print base material.

[0005]

[Means for Solving the Problem] The ink jet printer concerning invention of claim 1 The printer head which has the ink nozzle which injects the ink hardened by the exposure of the beam of light for hardening to a print base material, The driving means to which this printer head is moved to a print base material, the drive control section which controls this driving means, the ink jet control section which controls injection of the ink from an ink nozzle, and the light source which emits light in the beam of light for hardening, A beam-of-light exposure means to irradiate the beam of light for hardening to the ink which has the exposure section prepared in the printer head, and was injected by the print base material, It has the exposure control section which controls the exposure of the beam of light for hardening by this beam-of-light exposure means, and the printer control section which controls a drive control section, an ink jet control section, and an exposure control section based on the inputted image data information.

[0006] A beam-of-light exposure means to have the optical cable with which it is prepared between the light source and a printer head, and the exposure section is prepared in the point by the side of a printer head, and the lens prepared in the exposure section is used for the ink jet printer concerning invention of claim 2.

[0007] The printer control section which controls an exposure control section and an ink jet control section to double the timing of an exposure of the beam of light for hardening with the timing to which ink adheres to a print base material is used for the ink jet printer concerning invention of claim 3.

[0008] A beam-of-light exposure means to irradiate ultraviolet rays as a beam of light for hardening, and the ink hardened by ultraviolet rays are used for the ink jet printer concerning invention of claim 4.

[0009] A beam-of-light exposure means to irradiate a laser beam as a beam of light for hardening, and the ink hardened by the laser beam are used for the ink jet printer concerning invention of claim 5.

[0010] The ink jet printer concerning invention of claim 6 makes the class of light source exchangeable according to the class of ink.

[0011] The ink jet printer concerning invention of claim 7 is equipped with the sensor which detects the irregularity of a print base material front face, a printer head presupposes that it is movable also in the direction which attaches and detaches to a print base material by the driving means, and a drive control section controls a driving means according to the information from a sensor.

[0012]

[Embodiment of the Invention] Hereafter, the gestalt of implementation of this invention is explained about drawing. Drawing 1 is the block diagram showing an ink jet printer with an example of the gestalt of implementation of this invention. In this example, the metal panel for manufacturing for example, the ornament panels for elevators (a cage interior wall, the door of a cage, door of a bus stop, etc.) is used as a print base material 1.

[0013] The ink nozzle 3 which injects ink 4 is formed in the front face of a print base material at the printer head 2. The thing of the ultraviolet curing form hardened by the exposure of the ultraviolet rays which are beams of light for hardening as ink 4 is used. Although the thing of acrylic and an epoxy cation system etc. is used for photo-curing form ink, what blended the sensitizer with polyfunctional monomer and acrylate oligomer is especially used for the ink 4 of an ultraviolet curing form. In such ink 4, a sensitizer forms a radical and causing the chain reaction of oligomer and a monomer is used.

[0014] The printer head 2 is supported by the driving means 5, and is freely movable horizontally (X shaft orientations and Y

shaft orientations) to the print base material 1. The driving means 5 has the belt 6 and the motor 7.

[0015] A driving means 5 is controlled by the drive control section 8. Injection of the ink 4 from an ink nozzle 3, i.e., the injection quantity, injection timing, etc. are controlled by the ink jet control section 9.

[0016] It has the optical cable 12 with which a beam-of-light exposure means 10 to irradiate ultraviolet rays to the ink 4 injected by the print base material 1 is established between the light source 11 which emits light in ultraviolet rays, and this light source 11 and the printer head 2, and exposure section 12a is prepared in the point by the side of the printer head 2, the lens 13 prepared in exposure section 12a, and the power source 14 of the light source 11. The focus of a lens 13 serves as an adhesion location of the ink 4 on the print base material 1.

[0017] The exposure timing of the ultraviolet rays by the beam-of-light exposure means 10 is controlled by the exposure control section 15. The drive control section 8, the ink jet control section 9, and the exposure control section 15 are controlled by the printer control section 16. Moreover, the printer control section 16 controls the exposure control section 15 and the ink jet control section 9 to double the exposure timing of ultraviolet rays with the timing to which ink 4 adheres to the print base material 1.

[0018] The image of the coloring pattern printed by the print base material 1 is created by computer 17. The data of the created image are sent to the printer control section 16 through the image data control section 18. The printer control section 16 controls the drive control section 8, the ink jet control section 9, and the exposure control section 15 based on the inputted image data information.

[0019] In such an ink jet printer, ultraviolet rays are irradiated from exposure section 12a at the same time the ink 4 injected from the ink nozzle 3 adheres to the print base material 1, and the ink 4 adhering to the print base material 1 is hardened immediately. For this reason, deterioration of the image quality by blot of ink 4 can be prevented, not carrying out special processing for preparing an ink absorbing layer to the print base material 1, and reducing cost.

[0020] Moreover, since the lens 13 was formed in exposure section 12a and the focus of a lens 13 was made into the adhesion location of the ink 4 on the print base material 1, ultraviolet rays can be irradiated efficiently at ink 4, and ink 4 can be stiffened more certainly. Furthermore, since the exposure timing of ultraviolet rays was doubled with the timing to which ink 4 adheres to the print base material 1, ink 4 can be more certainly stiffened also by this.

[0021] Here, drawing 2 is the sectional view showing the 1st example of the ornament panel printed with the ink jet printer of drawing 1. In the 1st example, after the front face of the print base material 1 which is a metal panel adheres to ink 4 directly, the transparent protective coat layer (clear layer) 21 is formed from it. The protective coat layer 21 consists of an acrylic, urethane, or polyester resin. Moreover, fading inhibitors, such as an ultraviolet ray absorbent, an optical stabilizing agent, or a single oxygen quencher, are contained in the protective coat layer 21.

[0022] Next, drawing 3 is the sectional view showing the 2nd example of the ornament panel printed with the ink jet printer of drawing 1. The sealer layer 22 is formed in the front face of the print base material 1 in the 2nd example. It adheres to ink 4 on the sealer layer 22, and the protective coat layer 21 is formed from on the. The sealer layer 22 serves as a base color of the coloring pattern in ink 4, and metallic colors, such as gold, silver, and copper color, and the paint color of a pearl tone are used.

[0023] Moreover, drawing 4 is the sectional view showing the 3rd example of the ornament panel printed with the ink jet printer of drawing 1. In the 3rd example, the rust-proofing layer 23 is formed in the front face and rear face of the print base material 1 which consist of a steel plate by rust-proofing paint or rust-proofing plating. And on the surface rust-proofing layer 23, the sealer layer 22 which consists of a white coating is formed, it adheres to ink 4 further and the protective coat layer 21 is formed.

[0024] In addition, although the above-mentioned example showed the metal thing as a print base material 1, it may not be limited to this and you may be paper, resin, glass, a ceramic, a stone, etc. (resin films etc.). That is, since it is not necessary to form the acceptance layer of ink, various ingredients can be used as a print base material.

[0025] Moreover, although the ink of an ultraviolet curing form was used in the above-mentioned example, what is hardened by laser beams, such as excimer laser, for example, the thing hardened by infrared radiation may use the ink of other photo-curing forms. Furthermore, according to the class of ink, it is good also as exchangeable in the class of light source, and two or more sorts of ink can be used by one set of a printer.

[0026] Although the printer head 2 was made movable to the horizontal chisel in the above-mentioned example, it is good further again also as movable also to the direction (Z shaft orientations of drawing 1) which attaches and detaches to a print base material. In this case, the sensor which detects the irregularity of a print base material front face is added, and a drive control section should just control a driving means according to the information from a sensor. Thereby, also when irregularity is shown in the front face of a print base material, a printer head can be moved corresponding to irregularity and it can print uniformly.

[0027]

[Effect of the Invention] Deterioration of the image quality by blot of ink can be prevented reducing [as explained above, since the exposure section of a beam-of-light exposure means to irradiate the beam of light for hardening was prepared in the ink which adhered to the print base material at the printer head on which the ink jet printer of invention of claim 1 has an ink nozzle, do not have to carry out special processing for preparing an ink absorbing layer to a print base material, and] cost.

[0028] Since a beam-of-light exposure means had the optical cable with which it is prepared between the light source and a printer head, and the exposure section is prepared in the point by the side of a printer head, and the lens prepared in the exposure section was used for the ink jet printer of invention of claim 2, by making the focus of a lens into the adhesion location of the ink on a print base material, it can irradiate the beam of light for hardening efficiently at ink, and can stiffen ink more certainly.

[0029] Since the printer control section which controls an exposure control section and an ink jet control section was used for the ink jet printer of invention of claim 3 so that the timing of an exposure of the beam of light for hardening might be doubled with the timing to which ink adheres to a print base material, it can stiffen ink more certainly.

- [0030] Since a beam-of-light exposure means to irradiate ultraviolet rays as a beam of light for hardening, and the ink hardened by ultraviolet rays were used for the ink jet printer of invention of claim 4, it can stiffen ink more certainly.
- [0031] Since a beam-of-light exposure means to irradiate a laser beam as a beam of light for hardening, and the ink hardened by the laser beam were used for the ink jet printer of invention of claim 5, it can stiffen ink more certainly.
- [0032] Since the ink jet printer concerning invention of claim 6 made the class of light source exchangeable according to the class of ink, two or more sorts of ink can be used for it by one set of a printer.
- [0033] The ink jet printer of invention of claim 7 is equipped with the sensor which detects the irregularity of a print base material front face, a printer head presupposes that it is movable also in the direction which attaches and detaches to a print base material by the driving means, and since it controlled the driving means according to the information from a sensor, also when irregularity is shown in the front face of a print base material, a drive control section can move a printer head corresponding to irregularity, and can be printed uniformly.

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